Congruence and similarity: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes.

Section A: Consolidating (Questions 1-4)

Question 1

What does it mean for two shapes to be congruent?

Question 2

Name the four tests that can be used to show that two triangles are congruent. Give the abbreviation and the meaning of each.

Question 3

△ ABC cong △ PQR, with the vertices written in matching order.

(a) Which side of △ PQR is equal to AB?

(b) Which angle of △ PQR is equal to angle B?

Question 4

Two shapes are similar. What must be the same about them, and what can be different?

Section B: Standard (Questions 5-10)

Question 5

For each pair of triangles, state whether the triangles must be congruent. If they are, name the test.

(a) △ ABC: AB = 5 cm, BC = 7 cm, CA = 9 cm. △ DEF: DE = 5 cm, EF = 7 cm, FD = 9 cm.

(b) △ GHI: GH = 6 cm, angle H = 50°, HI = 8 cm. △ JKL: JK = 6 cm, angle K = 50°, KL = 8 cm.

(c) △ MNO: angle M = 40°, angle N = 75°, MN = 10 cm. △ STU: angle S = 40°, angle T = 75°, ST = 10 cm.

(d) Both triangles have a right angle, a hypotenuse of 13 cm and another side of 5 cm.

Question 6

Explain why knowing that two triangles have all three angles equal (AAA) is not enough to show they are congruent.

Question 7

Two triangles each have sides of 8 cm and 6 cm, and each has a 30° angle opposite the 6 cm side. Ben says the triangles must be congruent by SAS. Explain why Ben is not correct.

Question 8

△ ABC is similar to △ DEF, with A matching D, B matching E and C matching F. AB = 4 cm, BC = 6 cm, CA = 5 cm and DE = 12 cm.

(a) Find the scale factor that enlarges △ ABC to △ DEF.

(b) Find EF and FD.

Question 9

Decide whether each pair of triangles is similar. Show your working.

(a) Sides 3, 4, 5 and sides 6, 8, 10

(b) Sides 4, 6, 8 and sides 6, 9, 13

Question 10

One triangle has angles of 50° and 60°. Another triangle has angles of 60° and 70°. Are the triangles similar? Explain.

Congruence and similarity: answers

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Question 1

Answer: They are exactly the same shape and size, so one fits exactly on top of the other (after any translations, rotations or reflections).

Question 2

Answer: SSS (three sides equal), SAS (two sides and the included angle equal), AAS (two angles and a matching side equal; ASA also accepted), RHS (right angle, hypotenuse and one other side equal)

Question 3

Answer: (a) PQ (b) angle Q

Question 4

Answer: Matching angles are equal and matching sides are in the same ratio (same shape); the size can be different.

Question 5

Answer: (a) Congruent, SSS (b) Congruent, SAS (the 50° angle is between the given sides) (c) Congruent, ASA (also accept AAS) (d) Congruent, RHS

Question 6

Answer: Triangles with the same angles can be different sizes (one can be an enlargement of the other), so they are similar but not necessarily congruent.

Question 7

Answer: The 30° angle is not between the two given sides (not the included angle), so SAS does not apply; two different triangles can be drawn with these measurements.

Question 8

Answer: (a) 3 (12 ÷ 4) (b) EF = 18 cm, FD = 15 cm

Question 9

Answer: (a) Similar, all ratios equal 2 (b) Not similar (6/4 = 9/6 = 1.5 but 13/8 = 1.625)

Question 10

Answer: Yes. The third angle of the first triangle is 70°, so both have angles 50°, 60°, 70°; equal angles (AA) means similar.